

Claims

The claims defining the invention are as follows:

1. (Currently Amended) A vehicle suspension control system for a vehicle in which each wheel is supported from the chassis of the vehicle through a ~~fluid~~ pneumatically operated extension element which can control a degree of relative displacement between the wheel and the chassis, the extension element providing resilient support for the chassis from the respective wheel, the extension element further enabling the resilient relative movement between the vehicle-wheel and chassis said ~~control~~ control system comprising:

a controller;

~~a plurality of sensors associated with each wheel of the vehicle;~~

a source of pressurised fluid;

an exhaust for the pressurised fluid;

the source connected to each extension element through a first control valve;

the exhaust connected to each extension element through a second control valve;

the controller controlling the opening and closing of the first and second control valves to control the pressure within the extension elements.

~~a fluid flow controller comprising a fluid flow delivery means and a fluid exhaust means associated with each extension element;~~

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a first sensor associated with each wheel and adapted to sense the relative position between the wheel and the chassis and provide a first output tot the controller;

a second sensor associated with each extension element and adapted to sense the pressure of the fluid in each extension element and provide a second output to the controller;

the controller adapted to receive the first and second output from each of the sensors at each wheel, process the outputs and provide a wheel output to the fluid flow controller for each wheel-extension element to control the delivery of fluid or the exhaustion of fluid from respective extension element, wherein the wheel output for a wheel is derived from the signals of the first and second sensors for the respective wheel and the signals derived from the first and second sensors of the two most adjacent wheels supported by the chassis, whereby the fluid pressure within each extension element is varied in order that the force applied by the extension elements between the chassis and wheels will maintain the attitude of the chassis at a substantially~~substantially~~ constant datum plane relative to the general plane of the ground being traversed~~a plane~~.

2. (Cancelled)
3. (Cancelled)
4. (Currently Amended) A vehicle suspension ~~control~~control system for a vehicle as claimed at claim 1-3-wherein the adjacent wheels comprise a wheel which is most adjacent along the transverse axis of the chassis and a wheel which is most adjacent along a longitudinal axis of the chassis.
5. (Currently Amended) A vehicle suspension ~~control~~control system for a vehicle as claimed at claim 1 further comprising a third sensor mounted to the vehicle and which is adapted to provide a third output

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which is representative of the movement of the chassis in the vertical sense over the ground relative to free space, the suspension control system including a damping control for a fluid operated damper located between each wheel and the chassis, each damper being capable of providing a variable degree of damping, each damper being controlled by the damper control which is connected to the first and third sensors respectively to receive the first and third outputs, the damping control providing a damping output to each damper to vary the degree of damping applied by the damper in proportion to the magnitude of the third output wherein the signal from the third sensor is allowed or inhibited by the first output.

6. (Currently Amended) A vehicle suspension ~~control~~control system for a vehicle as claimed at claim 5 4 further comprising a fourth sensor adapted to provide a fourth output representative of the lateral acceleration of the chassis, the wheel output for a wheel being derived in part from fourth output received from the fourth sensor.
7. (Currently Amended) A vehicle suspension ~~control~~control system for a vehicle as claimed at claim 5 further comprising a fifth sensor adapted to provide ~~a~~ fifth output representative of the steering angle of the steering wheels, the wheel output for a wheel being derived in part from the fifth output received from the fifth sensor.
8. (Currently Amended) A vehicle suspension ~~control~~control system for a vehicle as claimed at claim 5 6 further comprising a sixth sensor adapted to provide a sixth output representative of the speed of the chassis over the ground, the wheel output for a wheel being derived in part from the sixth output received from the sixth sensor.
9. (Cancelled)

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10. (Cancelled)
11. (Currently Amended) A vehicle suspension ~~control~~control system for a vehicle as claimed at claim 9~~1~~ wherein in determining the wheel output the weighting applied to the first output of the first sensor of the respective wheel and the first output of the first sensors of each of the adjacent wheels is of the order of 2:1 to produce a resultant output.
12. (Currently Amended) A vehicle suspension ~~control~~control system for a vehicle as claimed at claim 8~~9~~ wherein the controller includes an adjustable control connected to the controller which provides a control signal which can be adjusted to vary the weighting or bias applied to the first outputs from each of the first sensors in determining the wheel output to control the permitted degree of change in attitude of the chassis relative to the plane.
13. (Currently Amended) A vehicle suspension ~~control~~control system for a vehicle as claimed at claim 9~~11~~ wherein the summation of the first ~~signals~~outputs is biased by the control signal to produce a resultant signal before the second ~~signal~~output is included, ~~to produce a resultant signal.~~
14. (Currently Amended) A vehicle suspension ~~control~~control system for a vehicle as claimed at claim 9~~12~~ or wherein the ratio of the weighting applied between the resultant signal and the second ~~signal~~output in deriving the wheel output is of the order of 10:1.
15. (Currently Amended) A vehicle suspension ~~control~~control system ~~system~~ for a vehicle as claimed at claim 11~~13~~ wherein the adjustable control provides a control signal comprising a pitch control, a roll control and a height control component.

16. (Currently Amended) A vehicle suspension ~~control~~control system for a vehicle as claimed at claim 14 wherein the control signal comprises a first control signal which is set to control the height of the chassis relative to the wheels.
17. (Currently Amended) A vehicle suspension ~~control~~control system for a vehicle as claimed at claim 14 wherein the control signal comprises a second control signal which is set to control the permitted degree of roll of the chassis relative to the plane.
18. (Currently Amended) A vehicle suspension ~~control~~control system for a vehicle as claimed at claim 15 wherein the control signal comprises a third control signal which is set to control the permitted degree of variation of pitch of the chassis relative to the plane.
19. (Currently Amended) A vehicle suspension ~~control~~control system for a vehicle as claimed at claim 1 wherein the controller includes a gyroscopic device adapted to provide a signal indicative of the ~~a~~ datum plane.
20. (Currently Amended) A vehicle suspension ~~control~~control system for a vehicle as claimed at claim 4 18 wherein the datum plane can be varied in its inclination.
21. (Cancelled)
22. (Withdrawn) A damping control for a vehicle comprising a fluid operated damper between each wheel and the chassis each damper being capable of providing a variable degree of damping, each damper being controlled by a damper control, the control comprising a set of first sensors which provide a first output indicative of the relative position between the wheels and the chassis and a set of third sensors adapted to provide a third output indicative of the relative motion between the wheels and the chassis, the control further comprising a second control which receives the

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signal from the first and third sensors for each wheel, said second control providing a damping output to the damper control of each damper to vary the degree of damping applied by the damper in proportion to the third output wherein the signal from the third sensor is allowed or inhibited by the relative motion output of the first sensors.

23. (Cancelled)

24. (Cancelled)

25. (Cancelled)

26. (Currently Amended) A suspension system for a vehicle comprising a chassis and at least a front and rear pair of axles supporting wheels for rotational movement of the wheels wherein said suspension system comprises resilient support members in the form of pneumatically operated extension elements to provide resilient support for each of said wheels from said chassis, said resilient support members being controllable by a vehicle suspension control system the extension elements providing resilient support for the chassis from the respective wheel, the extension element further enabling the resilient relative movement between the wheel and chassis, said vehicle suspension system comprising:

a controller;

a source of pressurised fluid;

an exhaust for the pressurised fluid;

the source connected to each extension element through a first control valve;

the exhaust connected to each extension element through a second control valve;

the controller controlling the opening and closing of the first and second control valves to control the pressure within the extension elements.

a first sensor associated with each wheel and adapted to sense the relative position between the wheel and the chassis and provide a first output to the controller;

a second sensor associated with each extension element and adapted to sense the pressure of the fluid in each extension element and provide a second output to the controller;

the controller adapted to receive the first and second output from each of the sensors at each wheel, process the outputs and provide a wheel output to the fluid flow controller for each extension element to control the delivery of fluid or the exhaustion of fluid from respective extension element, wherein the wheel output for a wheel is derived from the signals of the first and second sensors for the respective wheel and the signals derived from the first and second sensors of the two most adjacent wheels supported by the chassis, whereby the fluid pressure within each extension element is varied in order that the force applied by the extension elements between the chassis and wheels will maintain the attitude of the chassis at a substantially constant datum plane relative to the general plane of the ground being traversed.

~~controller to vary relative displacement between each said wheel and said chassis and wherein said controller receives control signals from sensors operatively associated with said suspension system to provide signals indicative of relative displacement between each said wheel and said chassis and wherein in response to said signals said controller provides a control signal to each said resilient support member to thereby control said relative displacement between each said wheel and said chassis so as to maintain the attitude of said chassis substantially parallel with a plane of average axle articulation wherein said plane of average axle articulation comprises a plane bisecting an included angle formed between first and~~

~~second planes wherein said first plane is a plane passing through said front axle of said vehicle and said second plane is a plane passing through said rear axle of said vehicle.~~

27. (Cancelled)

28. (Cancelled)

29. (Cancelled)

30. (Cancelled)

31. (Cancelled)

32. (Cancelled)

33. (Cancelled)

34. (Cancelled)

35. (Cancelled)

36. (Cancelled)

37. (Cancelled)

38. (Withdrawn) A vehicle in which each wheel is supported from the chassis of the vehicle through a fluid operated extension element which can control a degree of relative displacement between the wheel and the chassis, the extension element enabling the resilient relative movement between the vehicle and chassis, and a vehicle suspension control as claimed at claim 1, said vehicle suspension control being associated with the extension elements for the purpose of controlling the extension elements.

39. (Withdrawn) A vehicle in which each wheel is supported from the chassis of the vehicle through an extension element which can control a degree of relative displacement between the wheel and the chassis, the extension element enabling the resilient relative movement between the vehicle and chassis and a damper associated with each extension element, the operation of the dampers being controlled by a damping control as claimed at claim 21.
40. (Withdrawn) A vehicle having a suspension as claimed at claim 24.